

DISTRIBUTED DIRECT FLUID CONTACTOR
Hagen et al.
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FIG. 1A

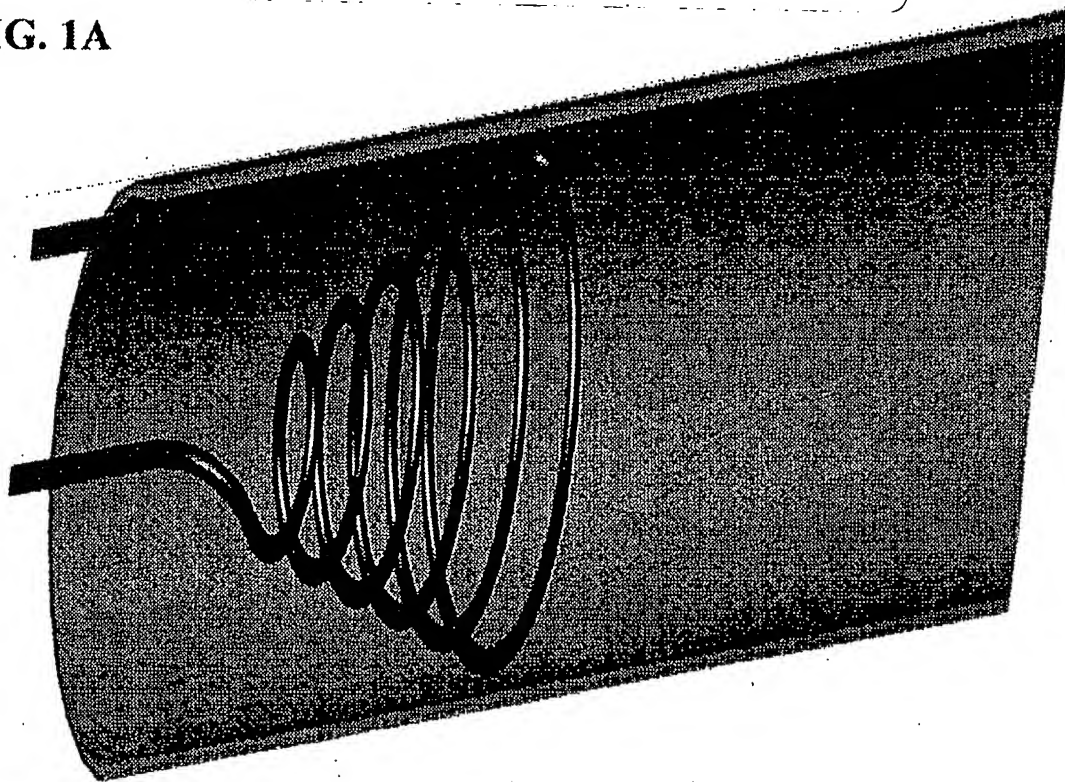
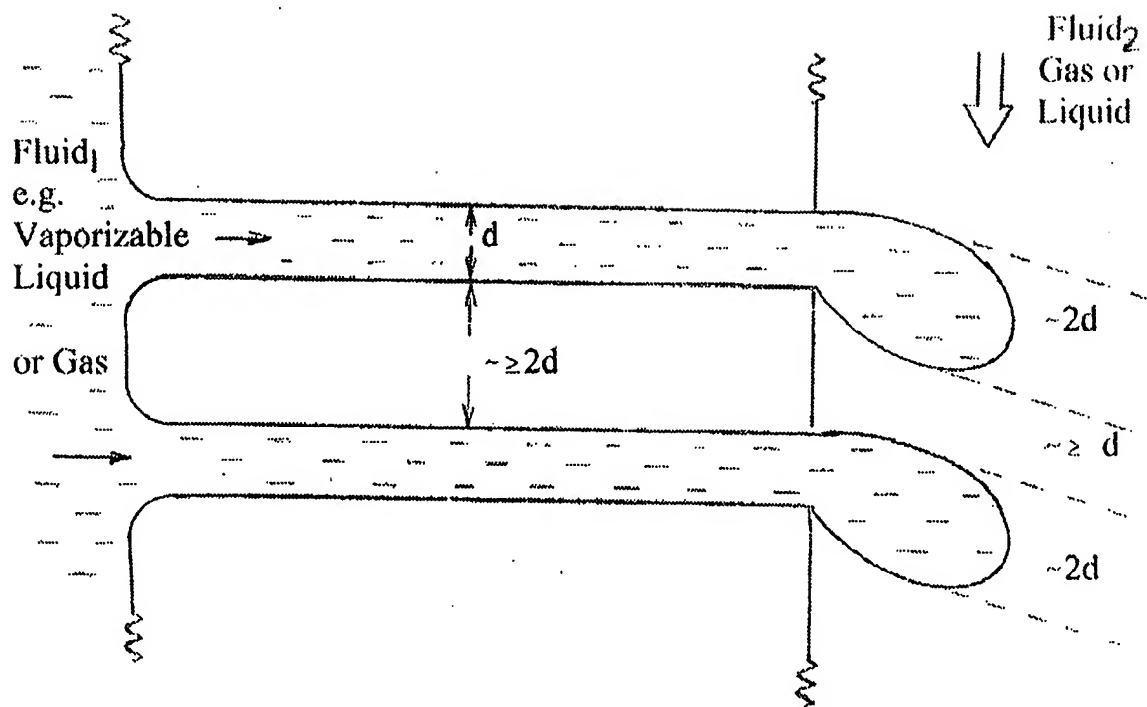


FIG. 1B

Tube Wall or Perforated Foil



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FIG. 1C Hexagonal Orifice Array

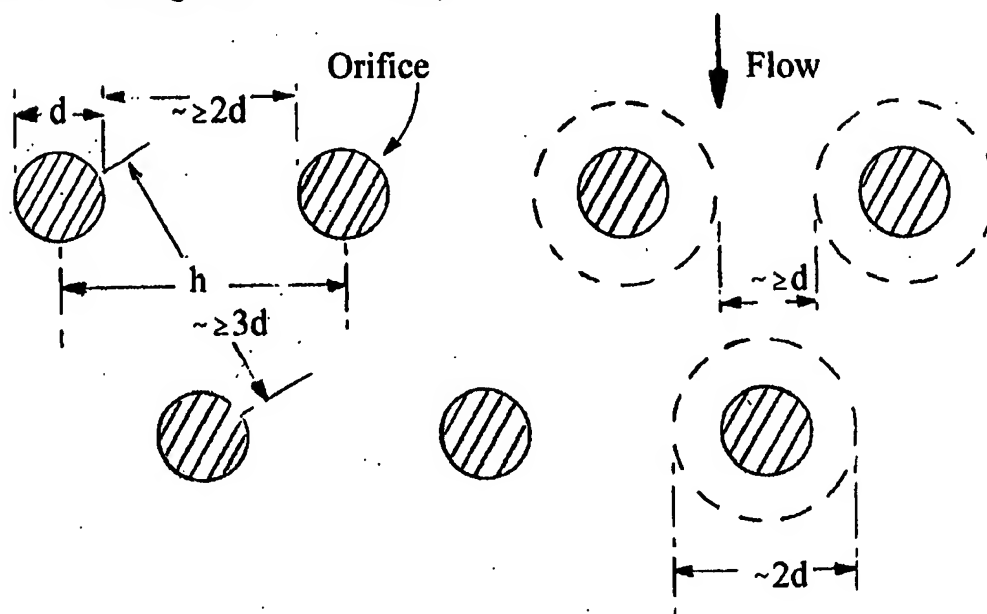
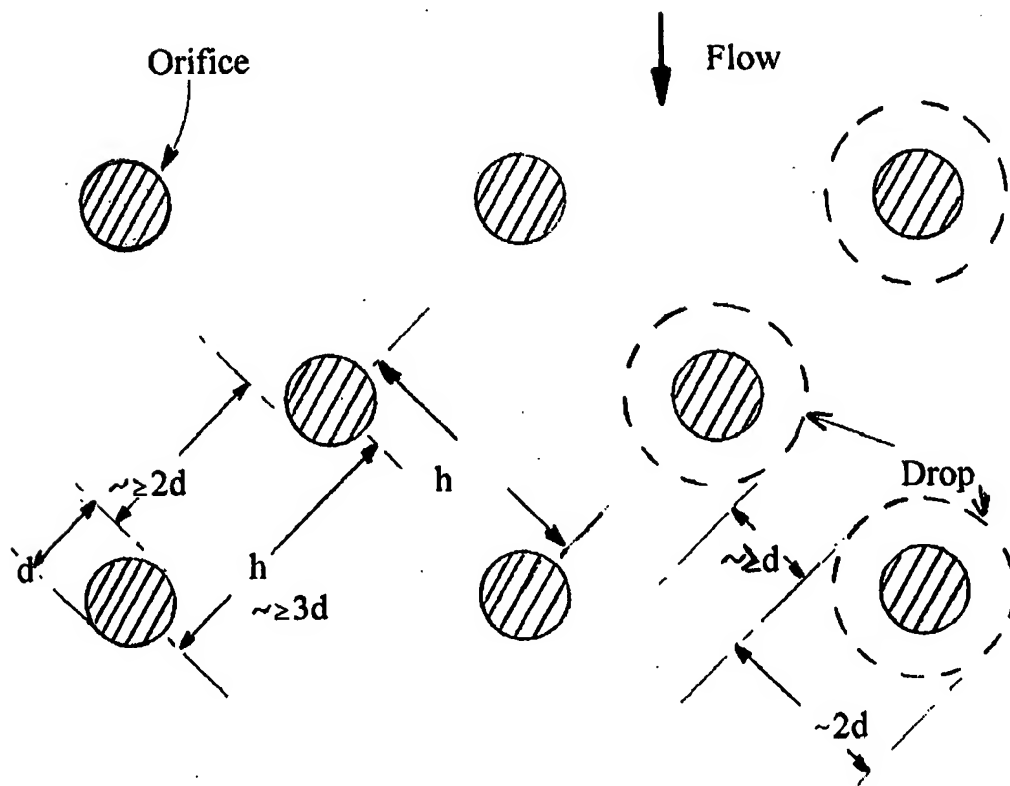


FIG. 1D Cartesian Orifice Array at 45°



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Fig 2 Tube Wall Sections Ground Thin in Curves or Flats

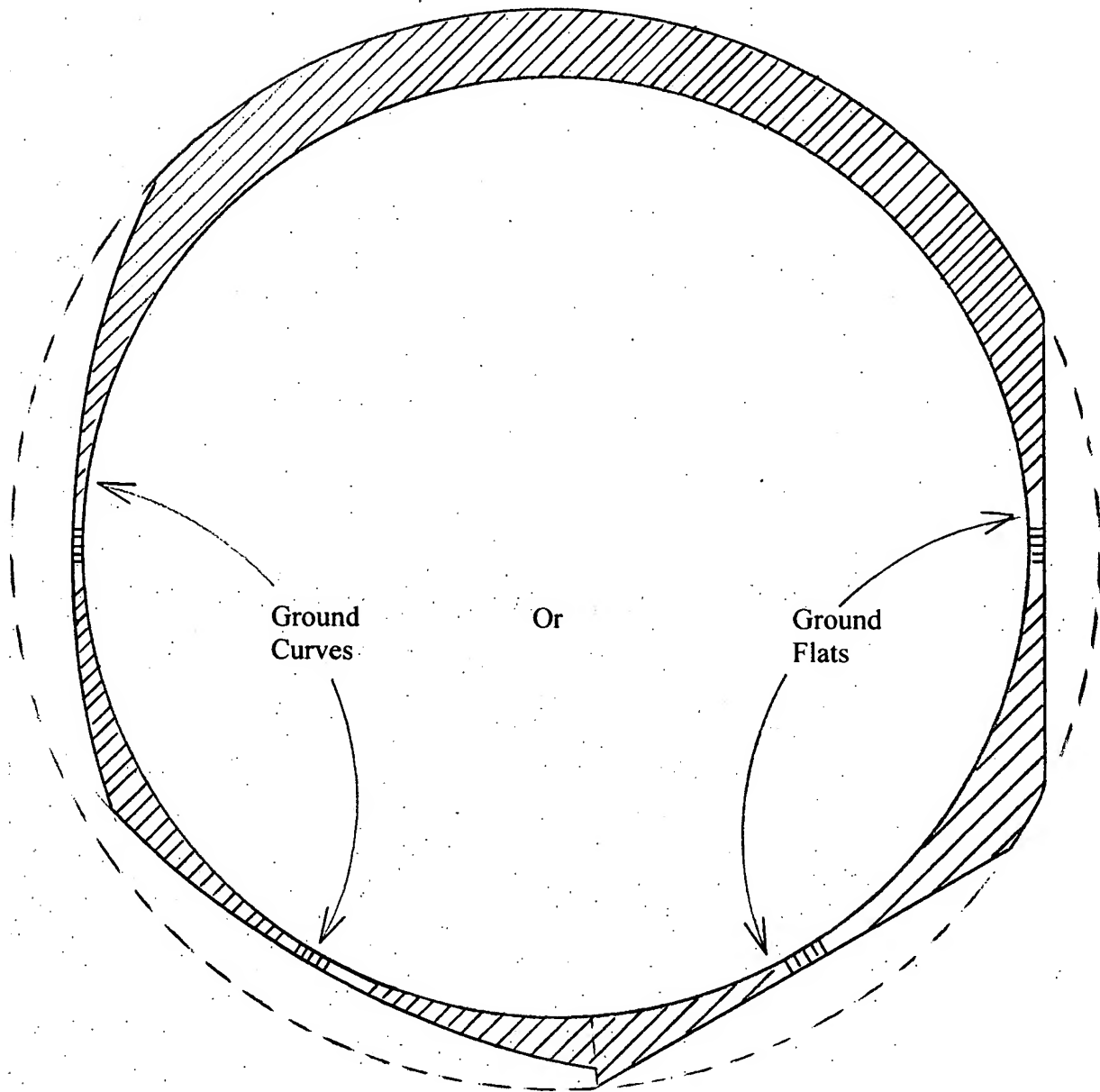


FIG. 3

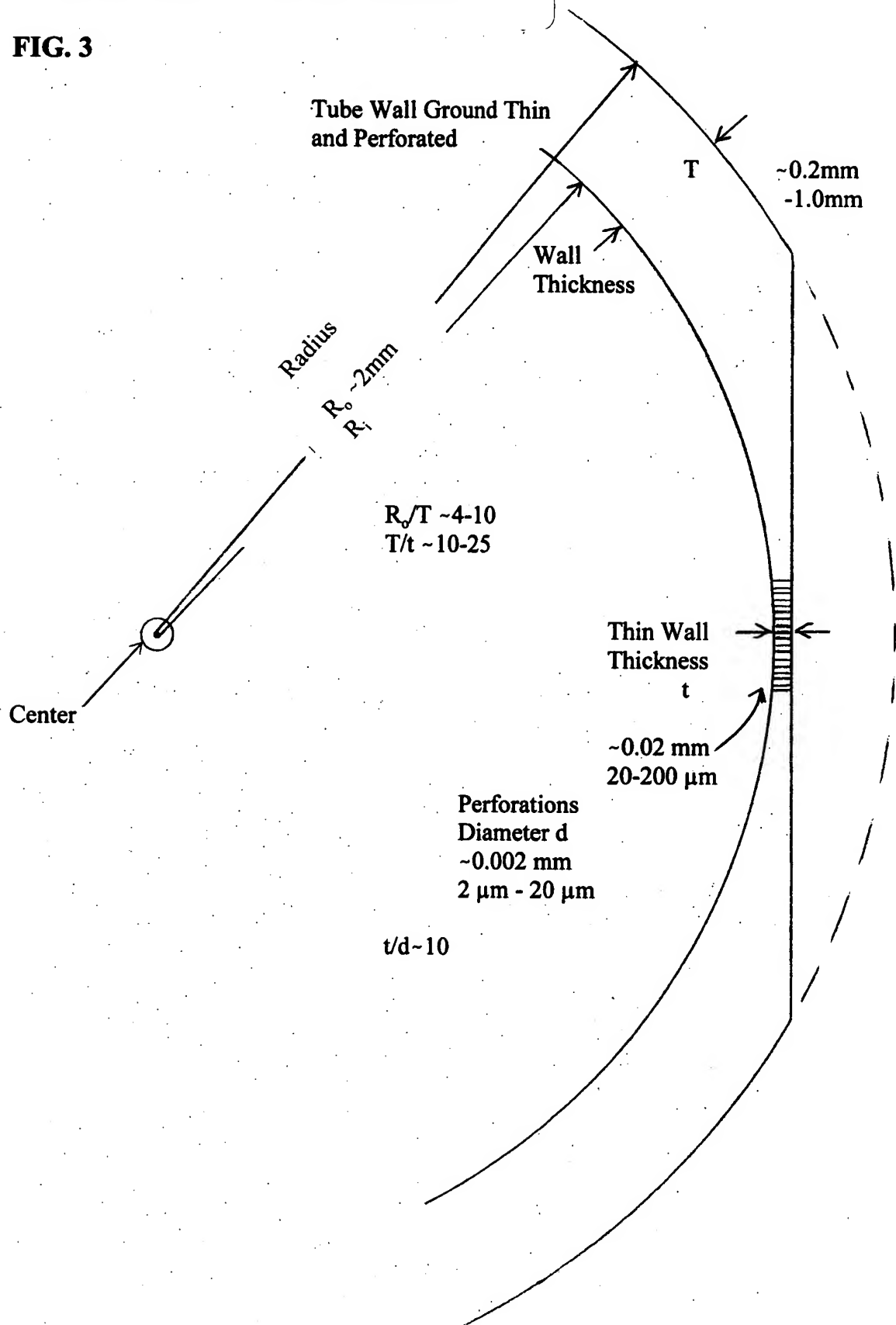
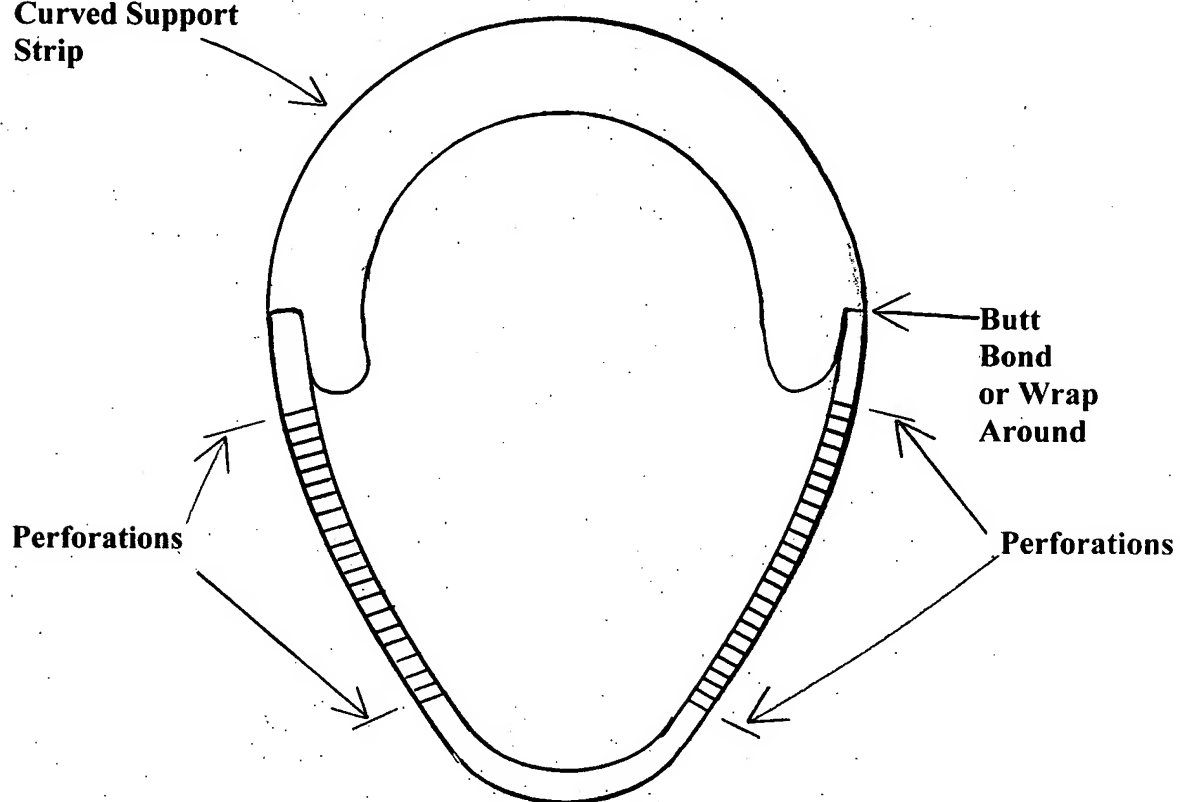


FIG. 4

Compound Perforated Tube

**Curved Support
Strip**



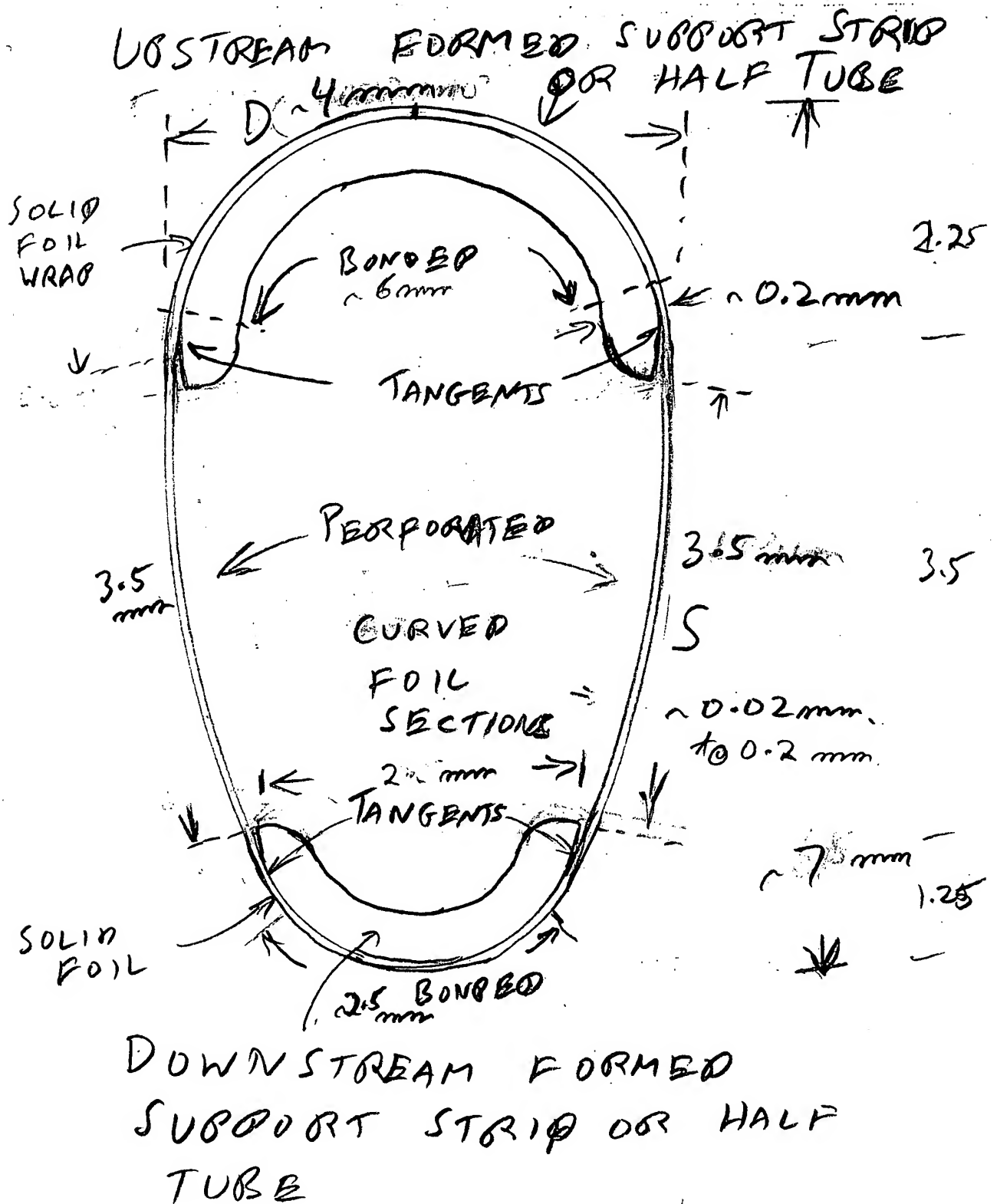
Perforations

**Butt
Bond
or Wrap
Around**

Perforations

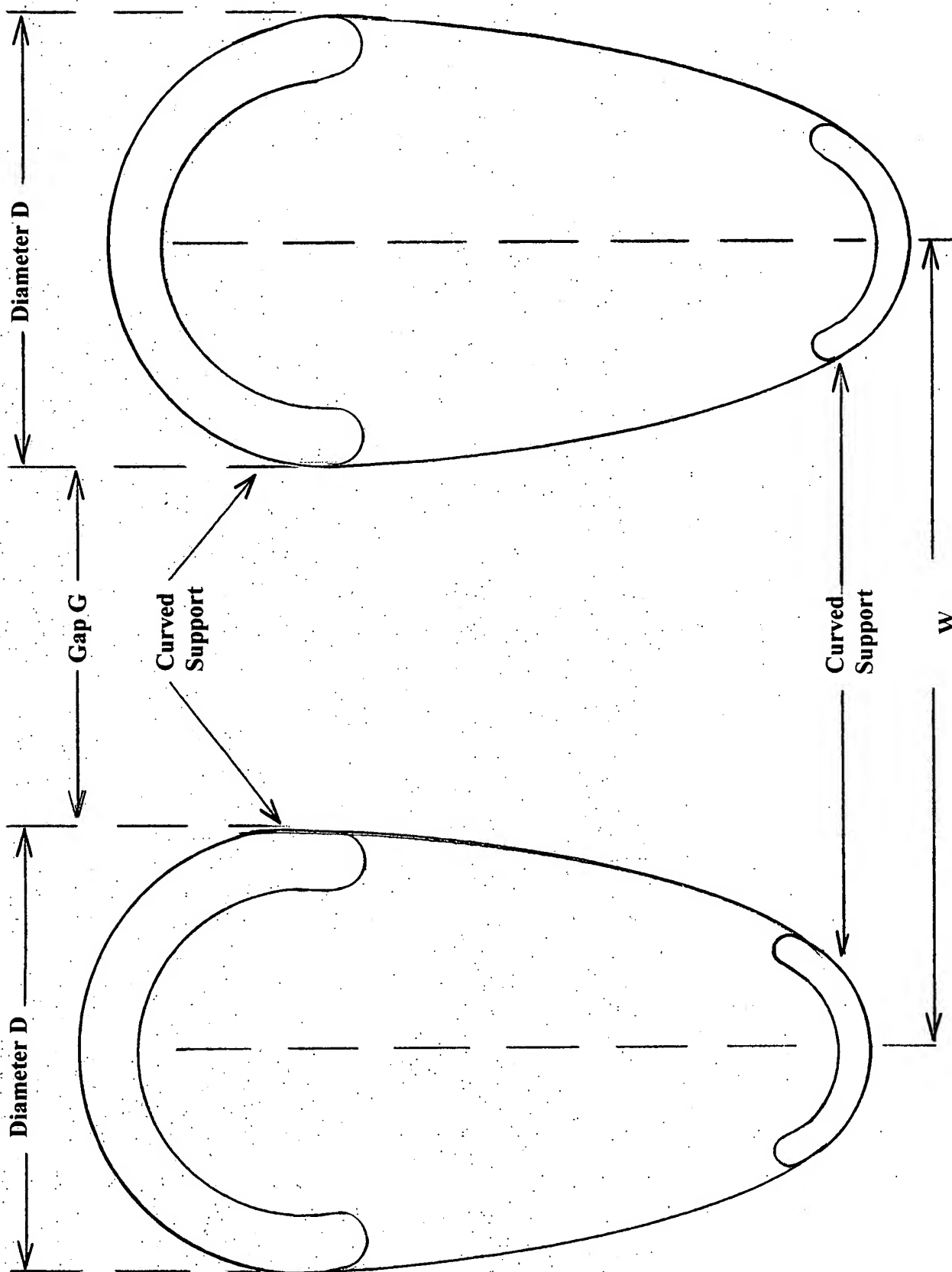
Thin Curved Perforated Strip

FIG. 5 Aerodynamic Compound Perforated Tube



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FIG. 7

Ribbed Tubular Structure to Support Perforated Foil

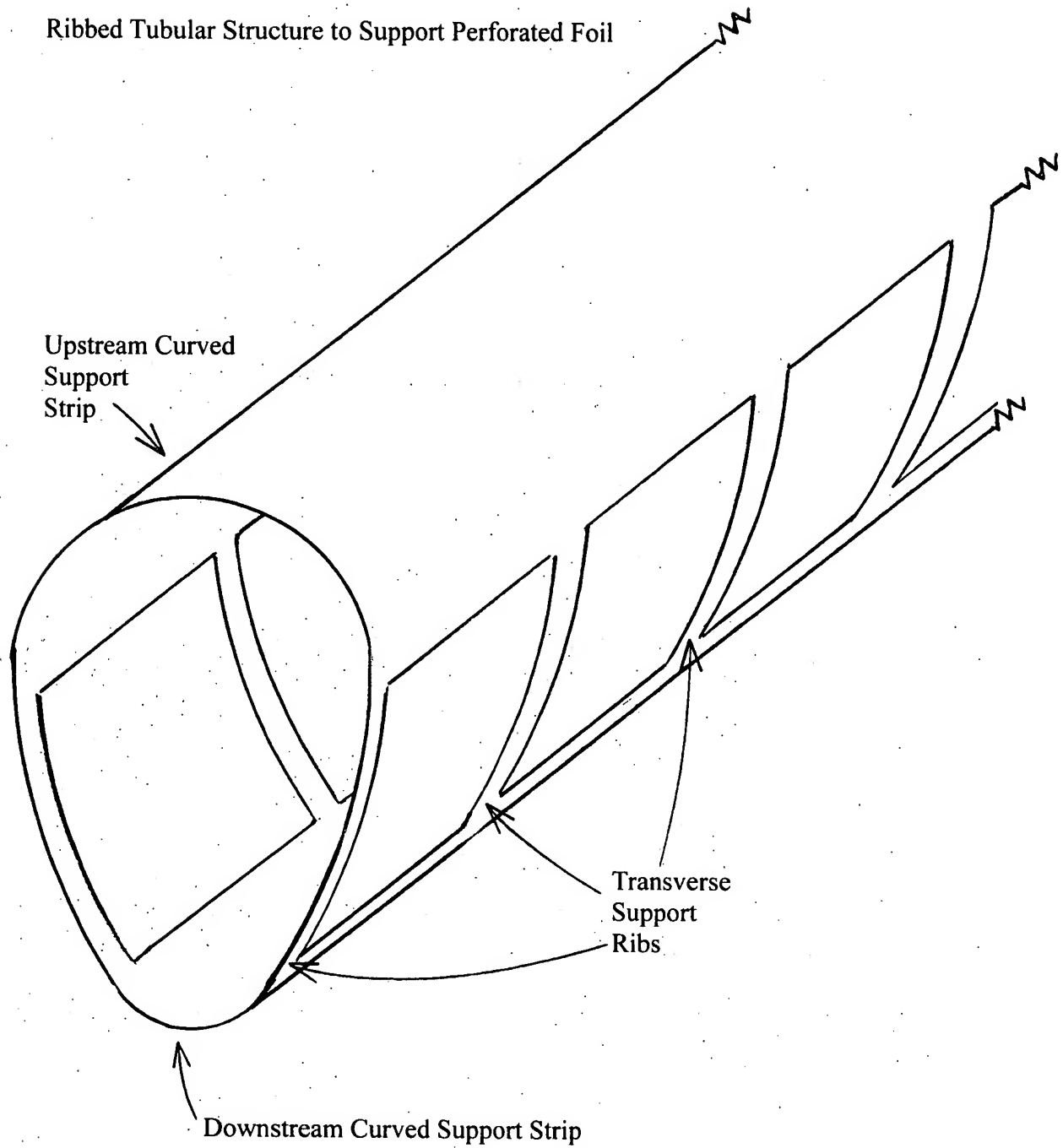
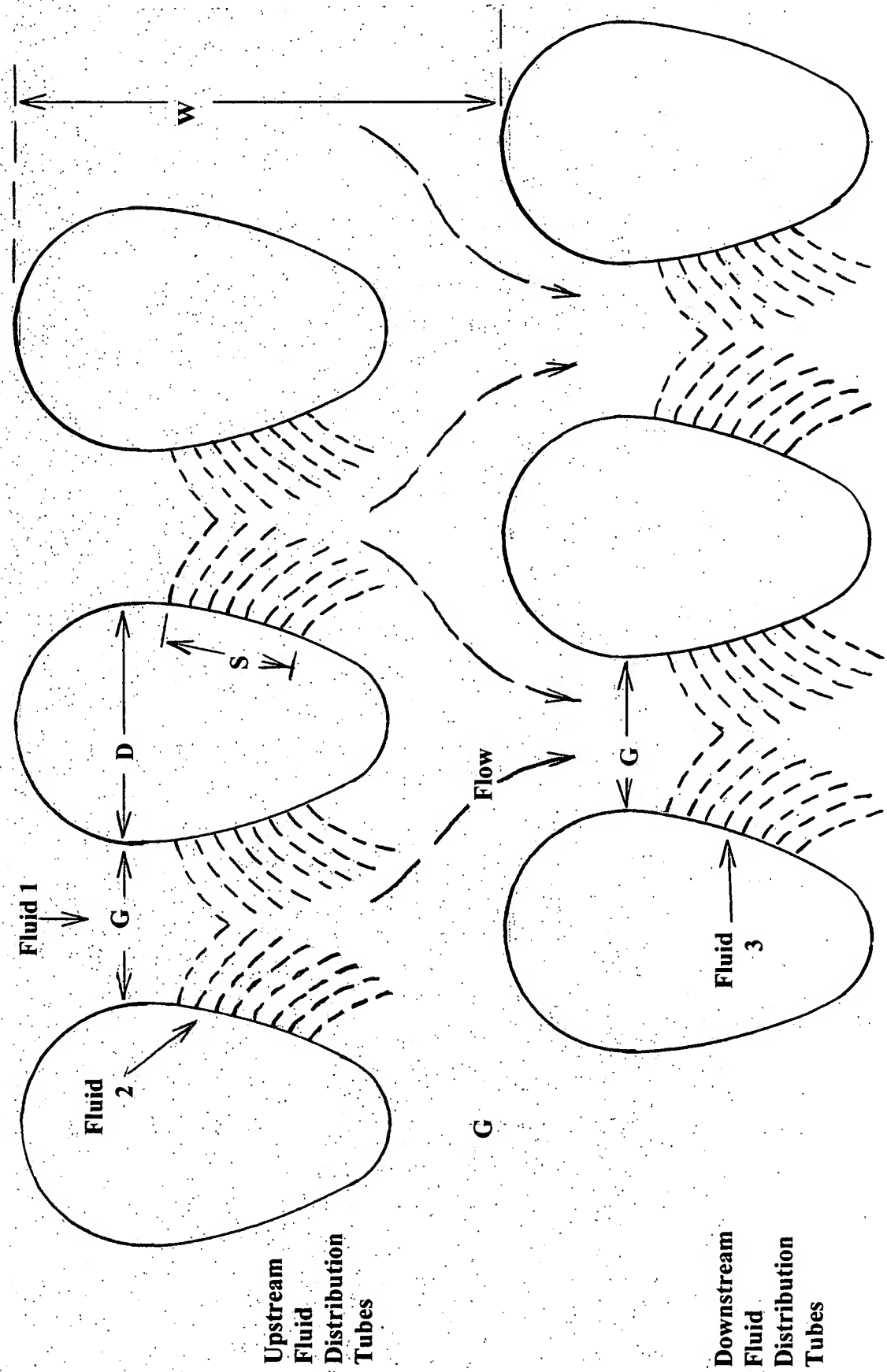


FIG. 8
Trifluid Direct Contactor



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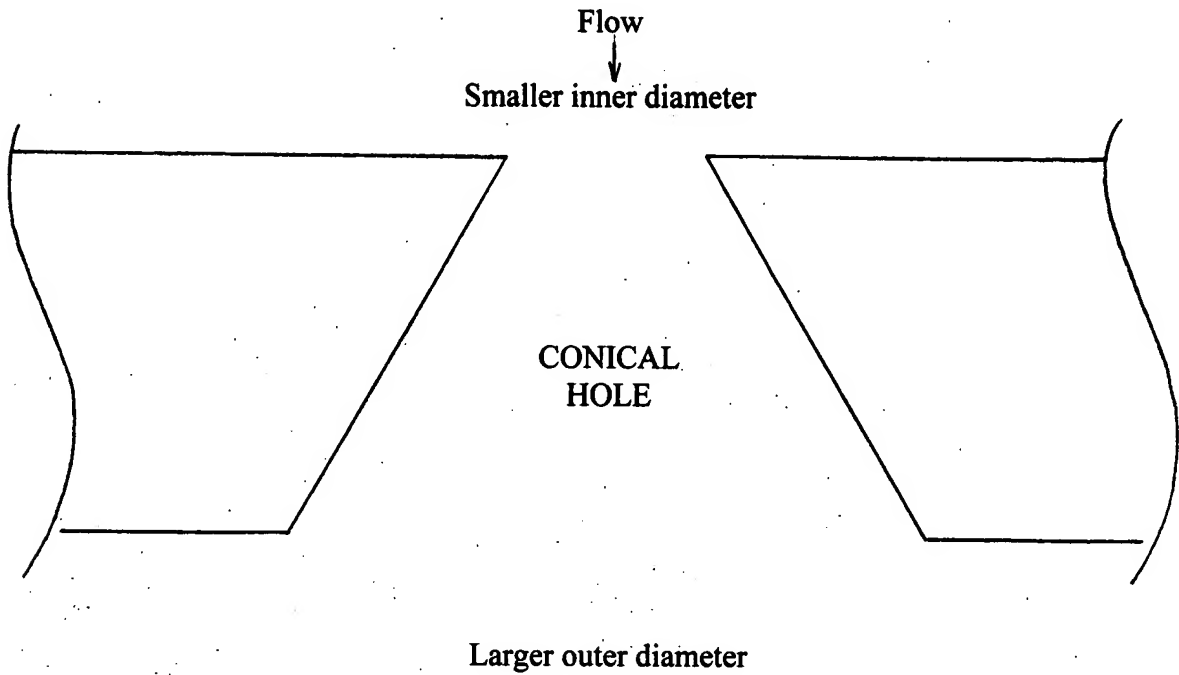
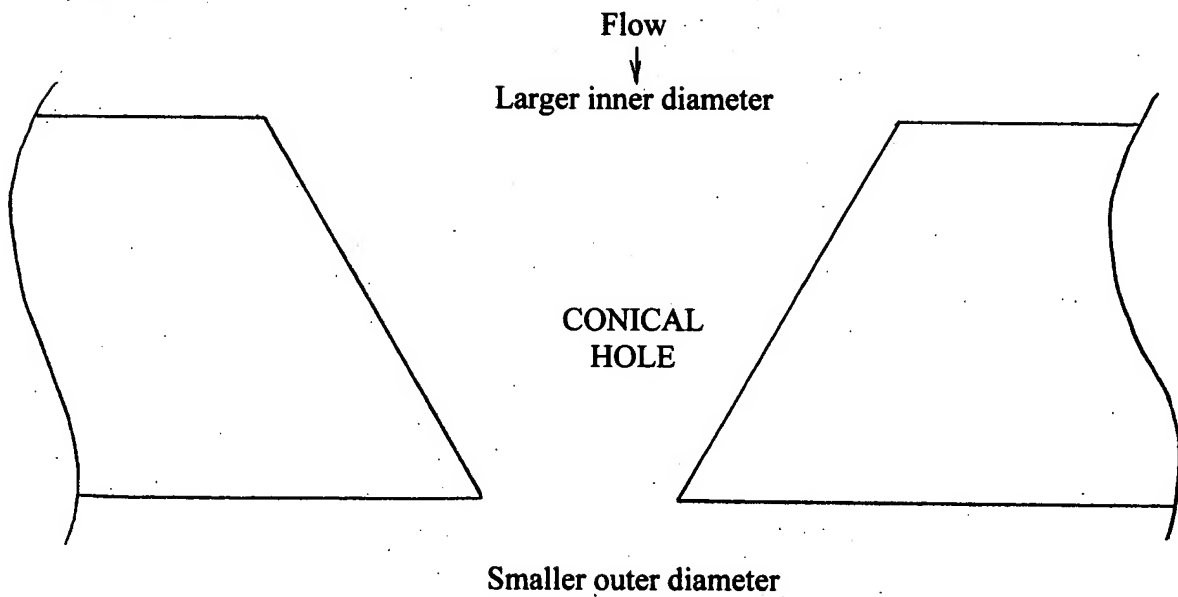
FIG. 9A**FIG. 9B**

FIG. 10A
Circular

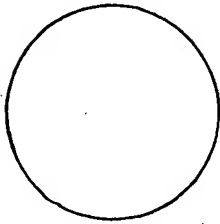


FIG. 10E
Dual Channel



FIG. 10B
Oval

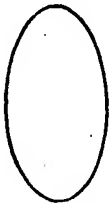


FIG. 10F
Flattened End



FIG. 10C
Streamlined

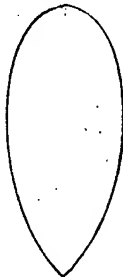


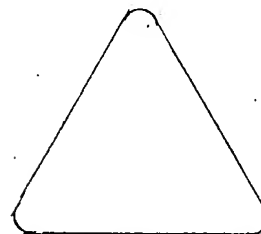
FIG. 10G
Asymmetric Streamlined



FIG. 10D
Flattened



FIG. 10H
Triangular



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FIG. 11A

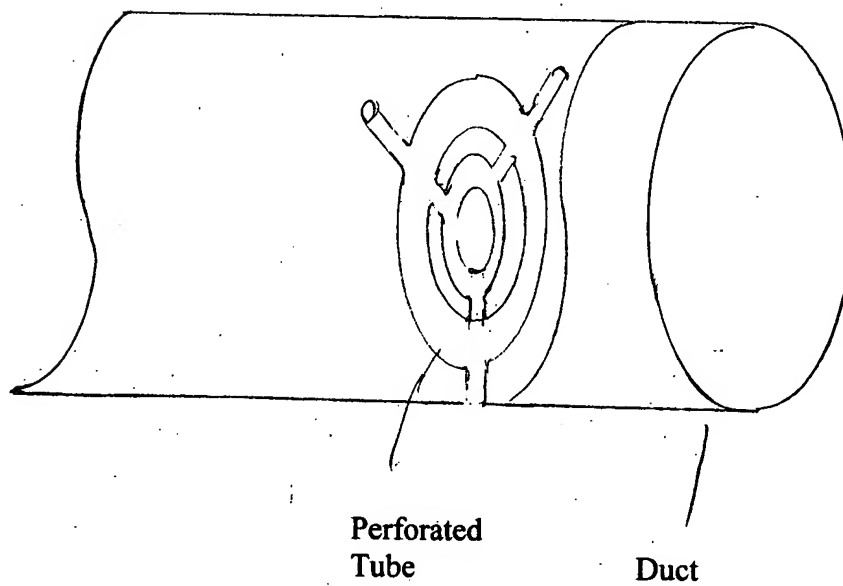
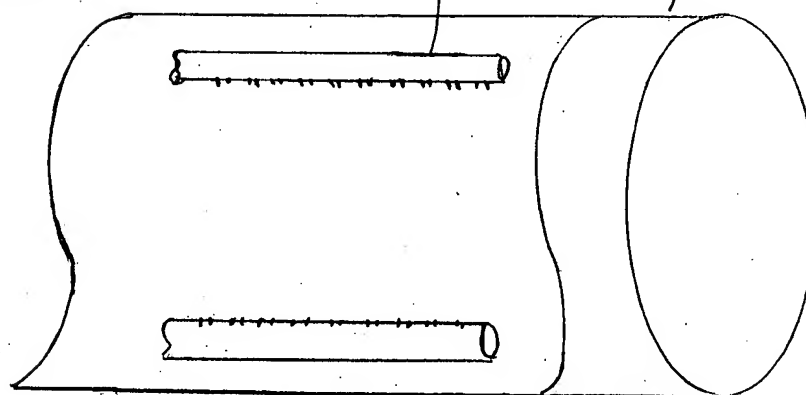


FIG. 11B

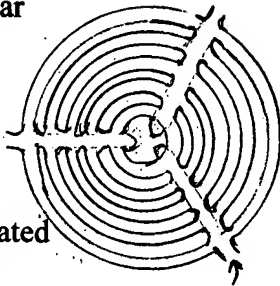


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FIG. 12A

Circular
Array

Perforated
Tubes

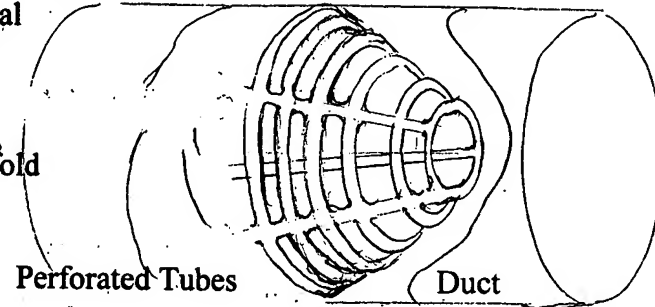


Manifold

FIG. 12D

Conical
Array

Flow
Manifold

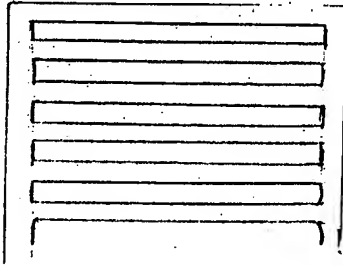


Perforated Tubes

Duct

FIG. 12B

Rectangular Array



Manifolds

FIG. 12E

Tent Array

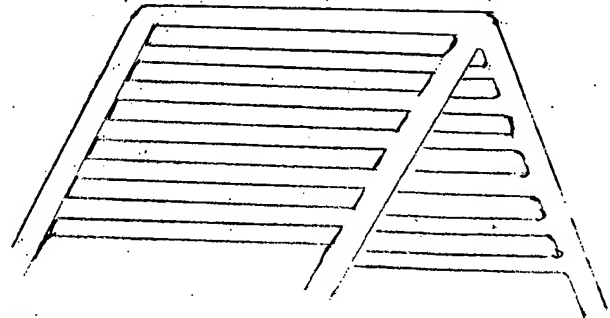


FIG. 12C

Annular Array

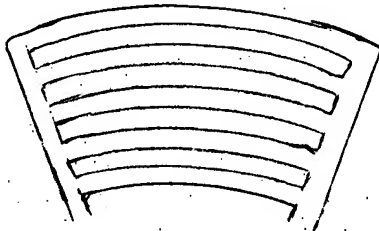


FIG. 12F

Annular Tent Array

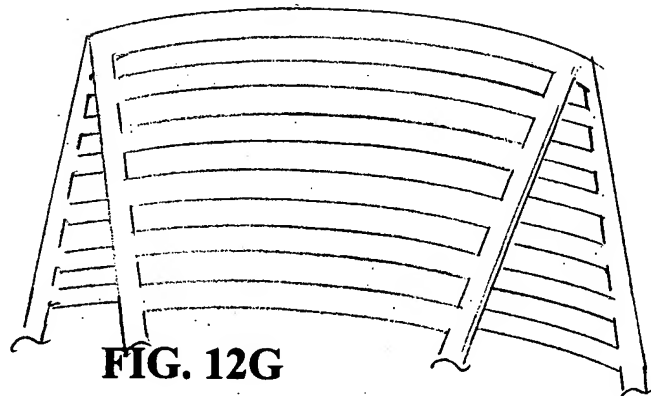


FIG. 12H

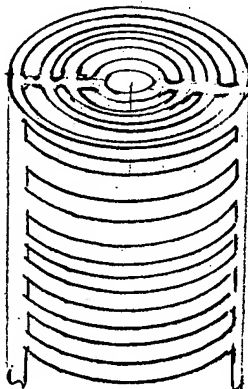
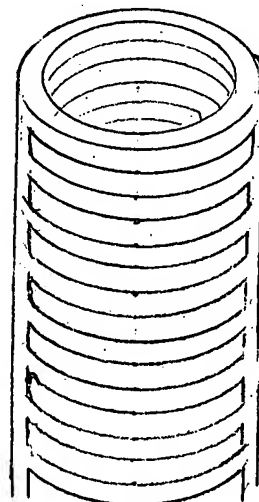


FIG. 12G



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FIG. 13A

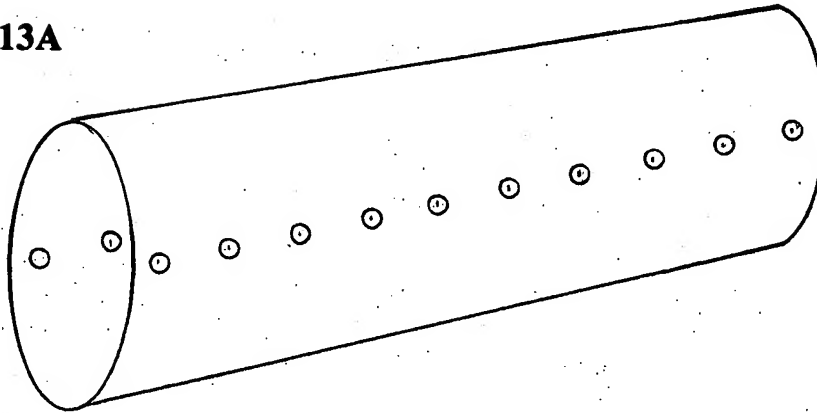


FIG. 13B

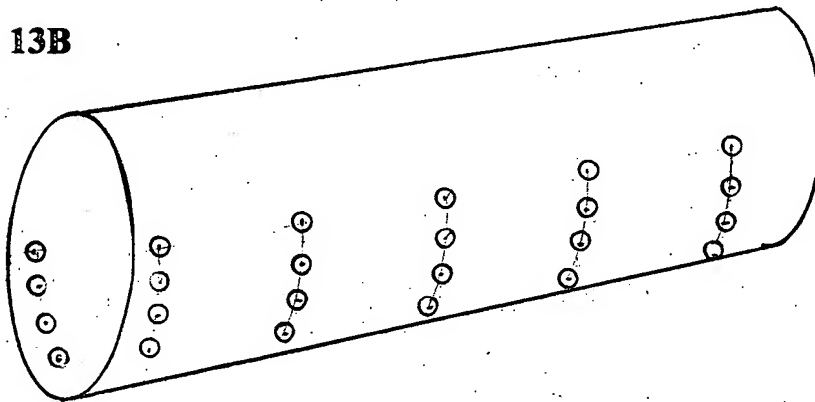
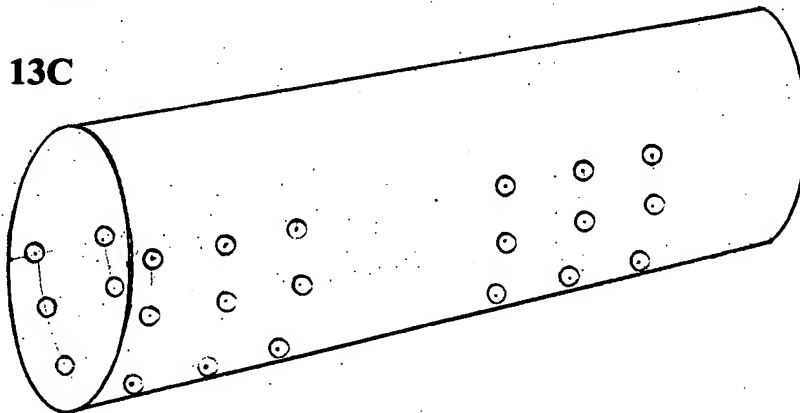


FIG. 13C



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Fig 14A

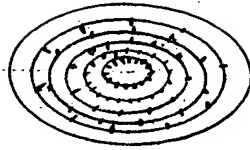


Fig 14D

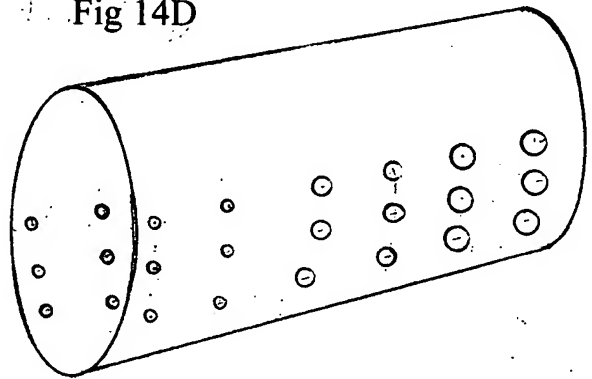


Fig 14B

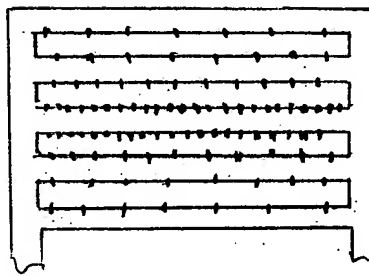


Fig 14E

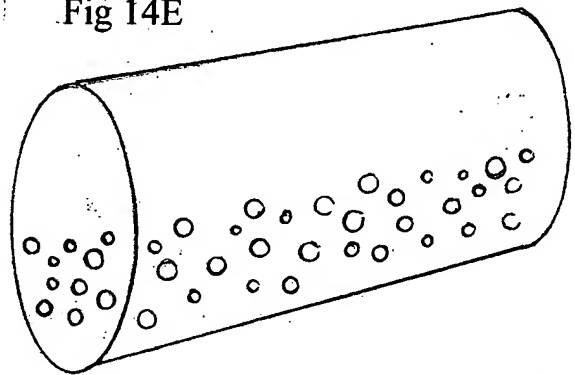


Fig 14C

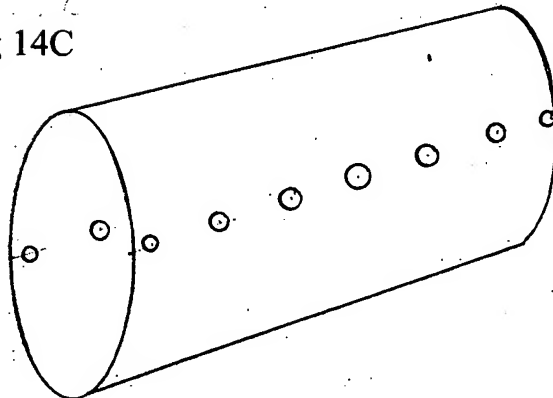
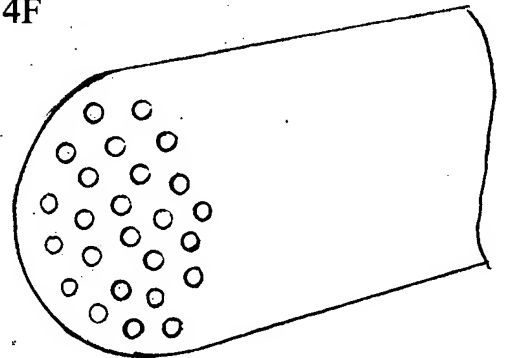


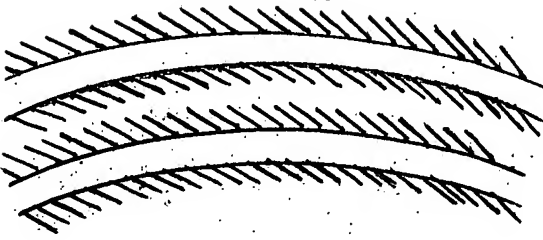
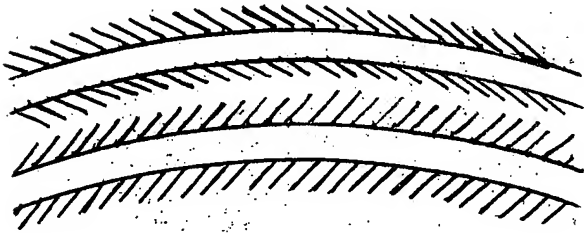
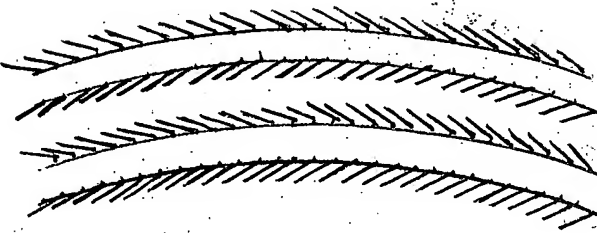
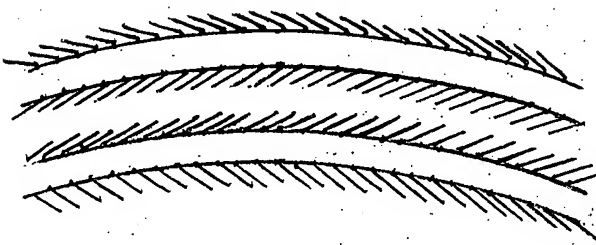
Fig 14F



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**FIG. 15A****FIG. 15B****FIG. 15C****FIG. 15D**

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FIG. 16A

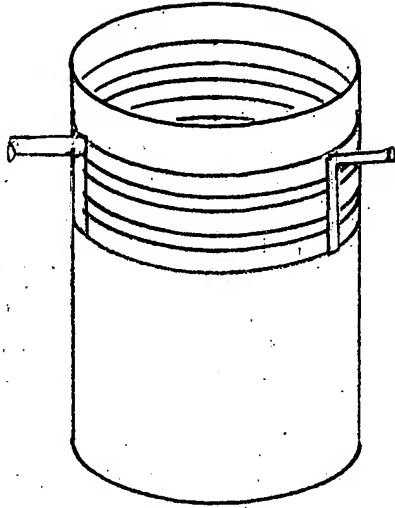
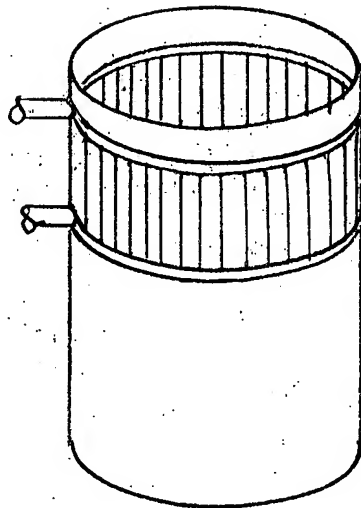
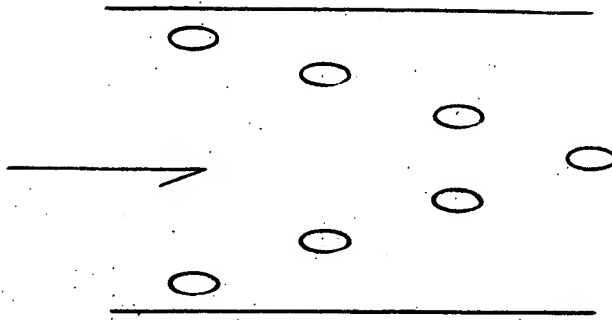
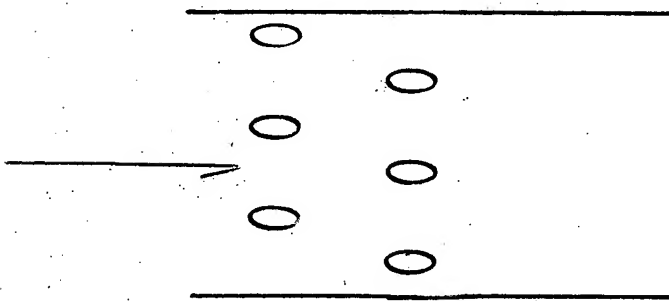
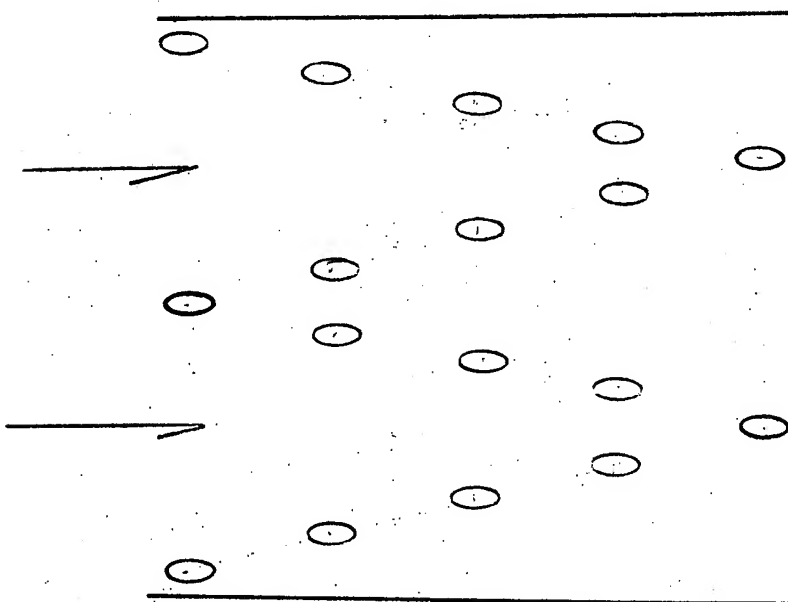


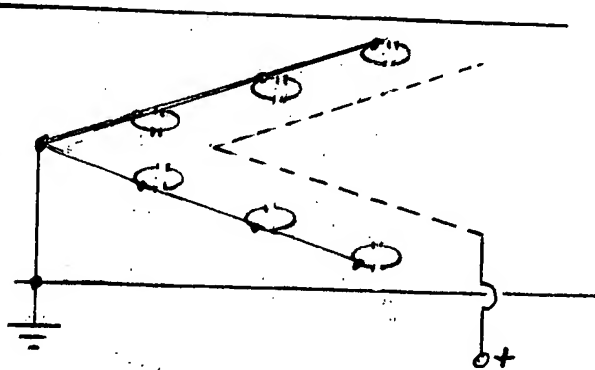
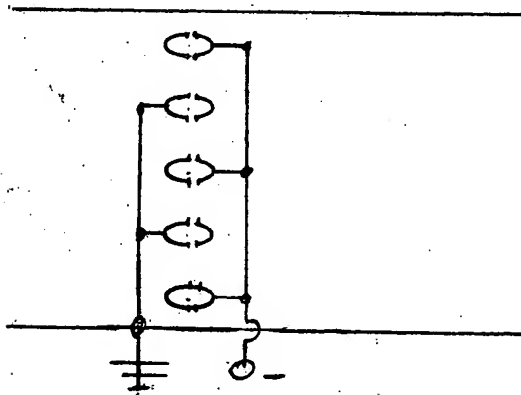
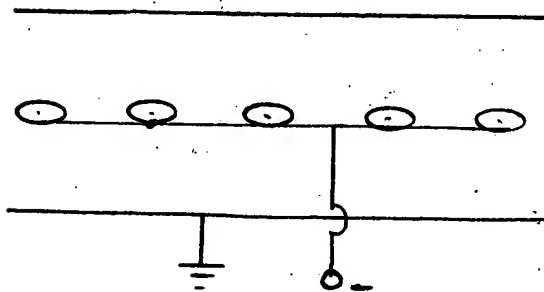
FIG. 16B



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FIG. 17A**FIG. 17B****FIG. 17C**

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FIG. 18A**FIG. 18B****FIG. 18C**

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FIG. 19

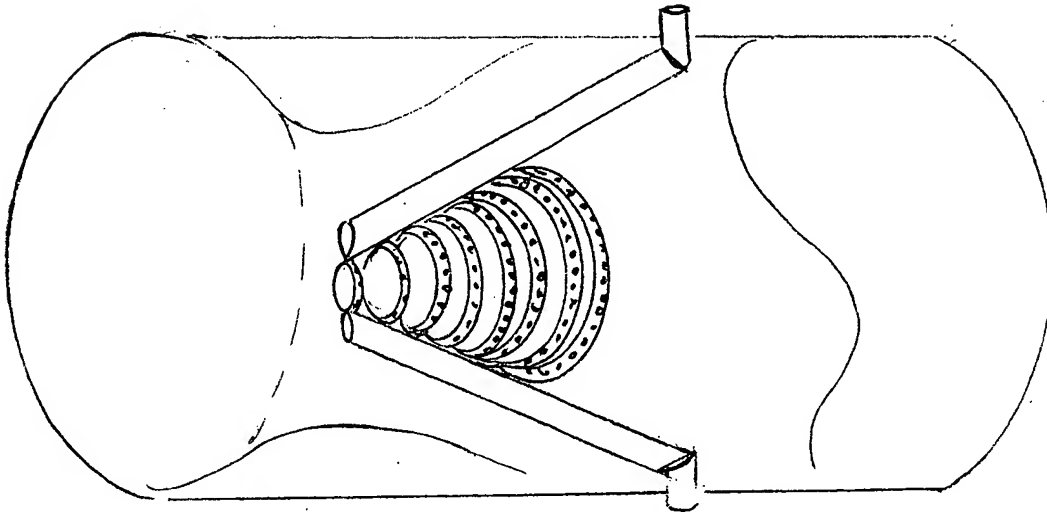


FIG. 20

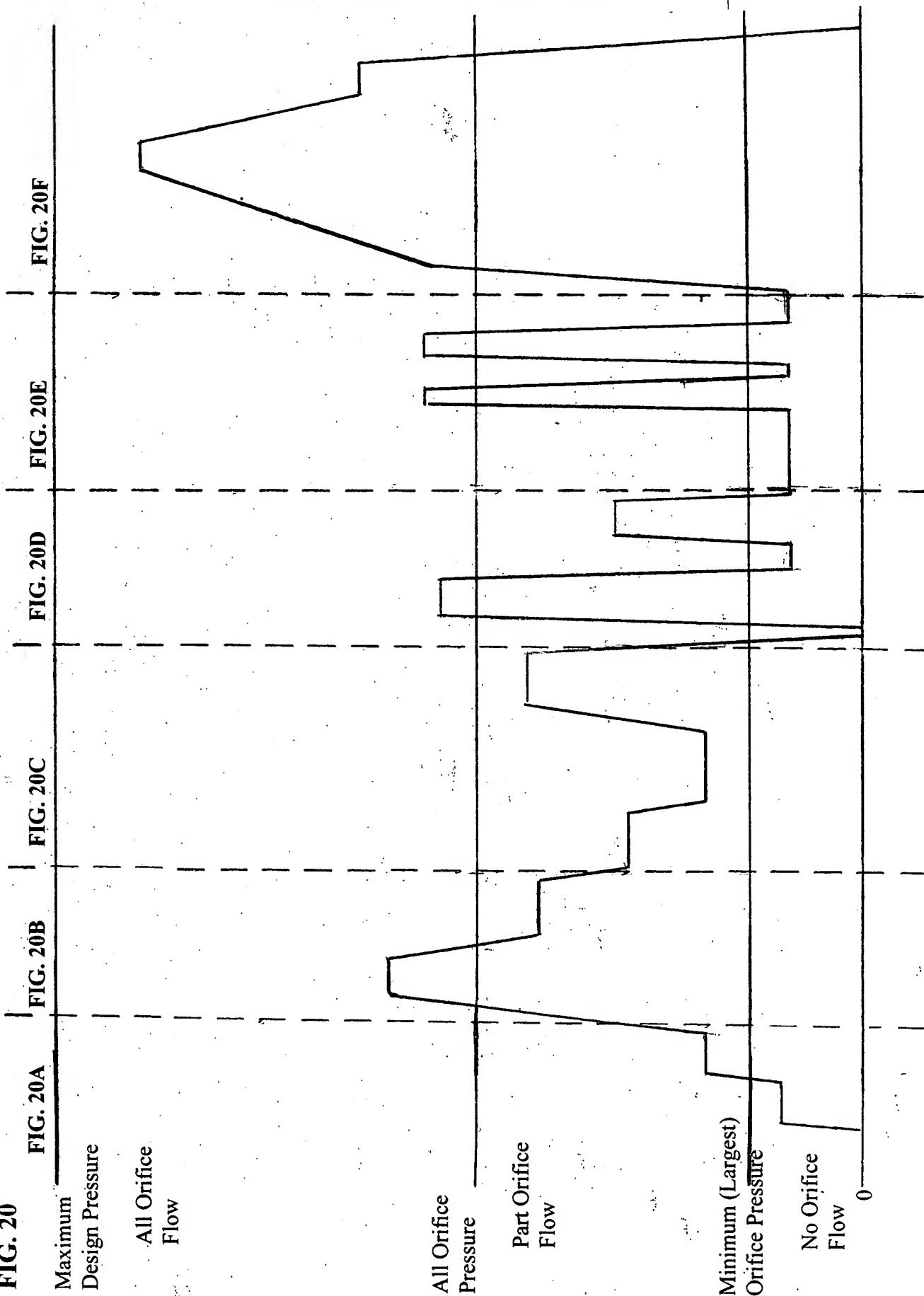
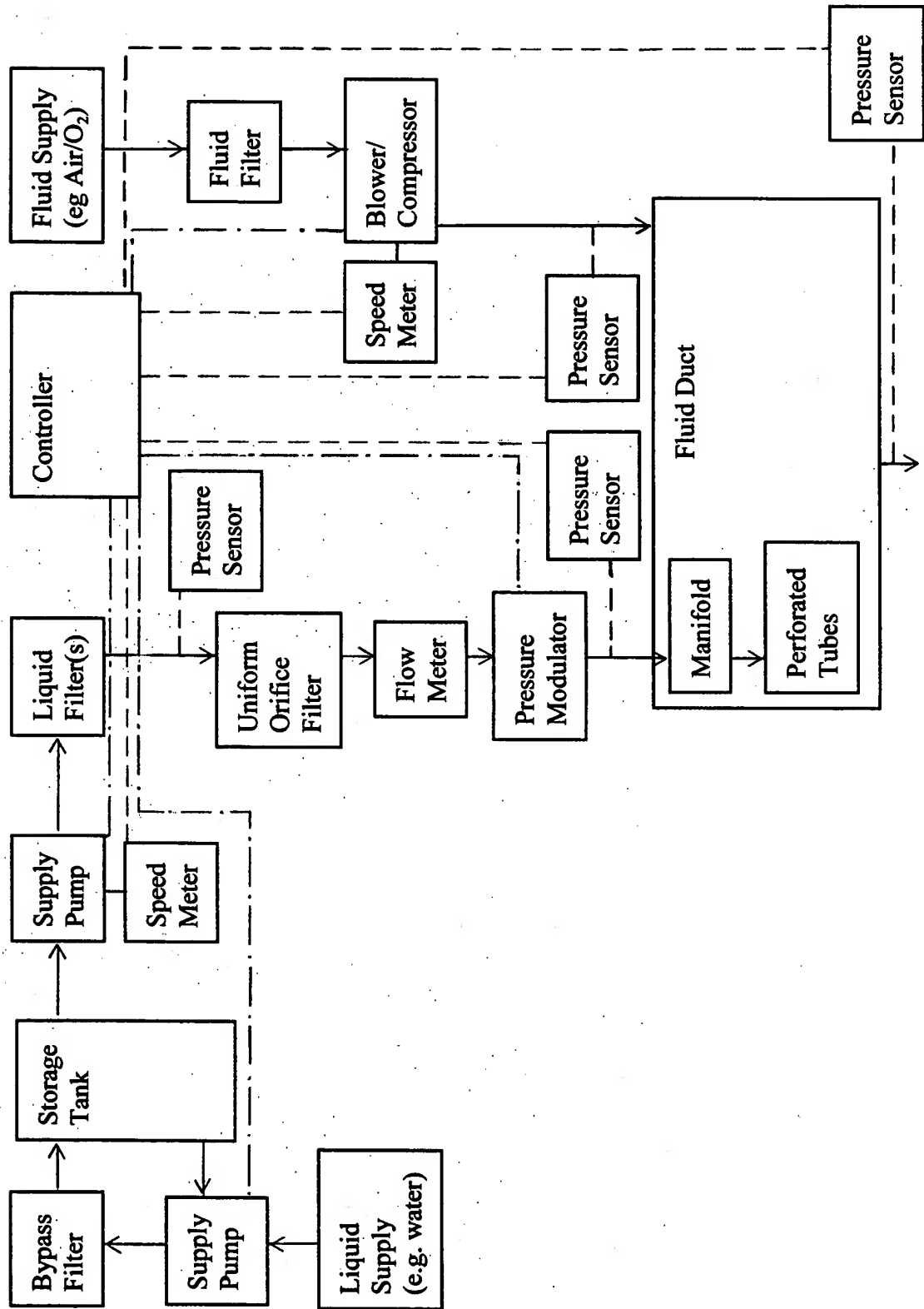


FIG. 21

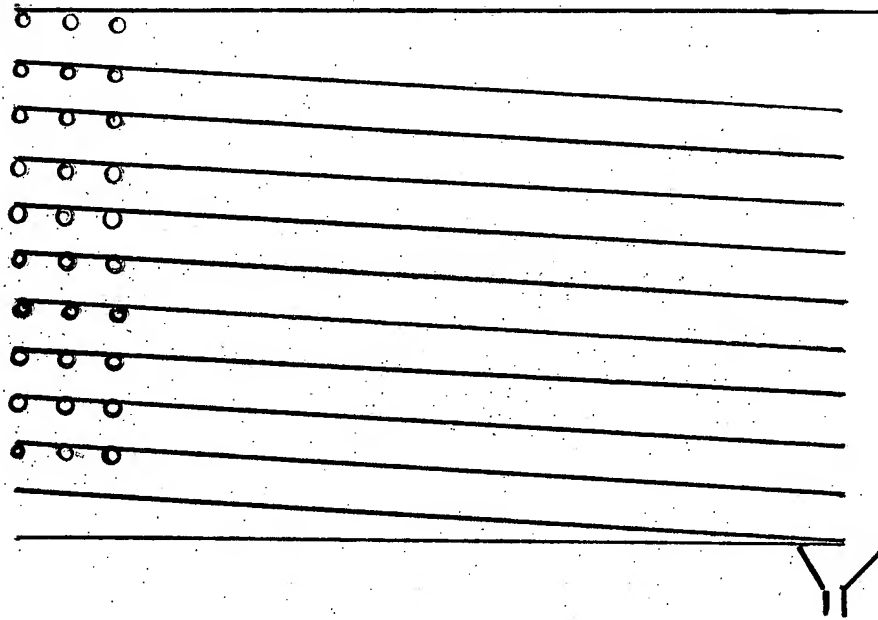


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FIG. 22



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FIG. 23A

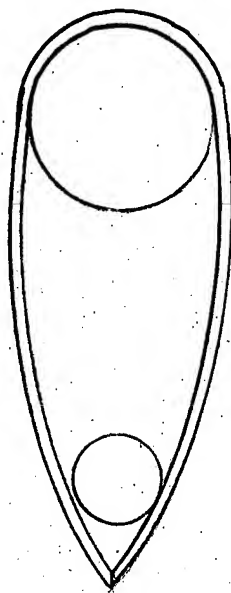


FIG. 23B

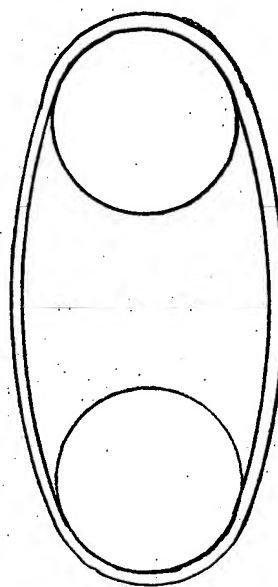


FIG. 23C

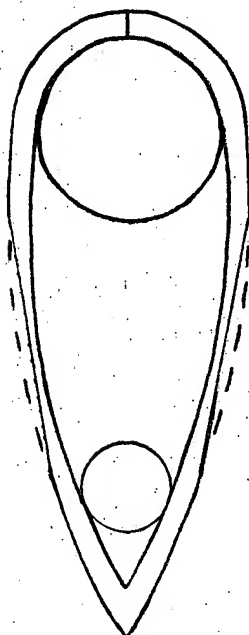
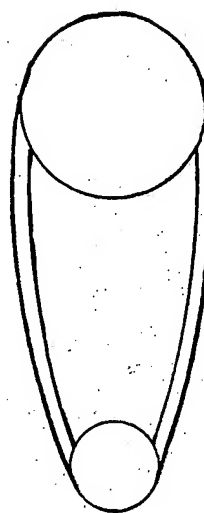


FIG. 23D



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FIG. 24

